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Implementation of nanoscience and nanoengineering into undergraduate mechanical engineering design courses

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ABSTRACT

Recent development in nanoscience and nanotechnology has substantially shaped today's engineering activities and human's life and will significantly impact the entire society in various ways in the near future. Today's undergraduate engineering education needs to represent such a trend to nurture the next generation of labor forces with well-prepared knowledge and skills. This study is to introduce our recent efforts to implement hands-on group design projects on nanofabrication machines for scale-up production of nanofibers and nanowires into existing mechanical engineering design courses to improve undergraduate students' nanoscale science and engineering education. The background of nanotechnology and scalable nanofabrication methods were introduced. Rational development of the hands-on design projects on mass nanofabrication machine designs was given. Several sample design projects were described and discussed in detail, which have been successfully implemented in our senior design courses in the recent years. Results of the design projects were provided and justified. Suggestions for future development and conclusion on the study were made.